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Inequalities in the Access to Healthcare:

Migration in Europe

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Abstract

This Work Project analyzes the unequal access to healthcare in Europe between 2004 and 2012, considering the migrant population in particular. Using the European Union Statistics on Income and Living Conditions (EU-SILC), the migrant status is determined primarily by the country of birth and secondarily established by citizenship, and the access to healthcare is measured by the unmet need for medical treatment. The empirical methodology follows an econometric approach. We start to observe that the difference between migrants and natives in the access to healthcare disadvantages the formers, although not substantial. On the other hand, it is found that the differences between age groups, for the total sample, turn out to affect relatively more the unmet needs than the migration issue. Considering the particular context of the European Union, if the migrant is not an EU citizen, the inequality in the access to healthcare is relatively more marked. This latter inequality is amplified when the reason that leads to unmet need results from financial constraints.

Keywords: access to healthcare; migrant; inequality; unmet need;

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1 – Introduction

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO),[1] "the term **migrant** can be understood as 'any person who lives temporarily or permanently in a country where he or she was not born." Furthermore, this definition is clarified by the United Nations, since, "according to some states' policies, a person can be considered as a migrant even when s/he is born in the country." This clarification, which emphasizes the relevance of each country's national policy, demonstrates that the definition of migrant is not consensual. Rechel et al. (2011) make that heterogeneity explicit, based on examples collected through health surveys of some European countries, from which we can highlight Italy, the Netherlands, Sweden and the United Kingdom. In Italy, the migrant status is determined by citizenship, while in the Netherlands the indicator is the country of birth of individuals and their parents, which allows for the distinction between first-generation and second-generation migrants (Mladovsky 2009)[2]. On the other hand, the United Kingdom uses, in addition to the country of origin, an indicator of ethnic status to classify migrants, whereas in Sweden it is prohibited to collect data on ethnicity. Thus, this diversity and the absence of a universally accepted criterion to define migrant is a barrier to a comparison of migrant health across countries (Rechel et al., 2011; Hannigan et al., 2016).

All the European Union Member States ratified the International Conevant on Economic, Social and Cultural Rights (ICESCR), whose Article 17 states "the right of everyone to the enjoyment of the highest attainable standard of physical and mental health". This latter right requires, amongst others, the accessibility to healthcare services. In this sense, the Member States must

[1] UNESCO Glossary: http://www.unesco.org/new/en/social-and-human-sciences/themes/international-migration/glossary/migrant/ (accessed in December 3 2017).
[2] The Dutch health surveys distinguish persons who were born outside the Netherlands (first-generation migrants) from Netherlands-born persons with, at least, one parent born outside the Netherlands (second-generation migrant). Plus, third-generation migrants and natives belong to the same category.

ensure a non-discriminatory, physical, economic and information accessibility of health facilities, goods, and services. (Pace and Shapiro, 2009).

However, despite these recommendations of the European Union's guiding documents, there is substantial evidence across countries of inequalities between migrants and natives in both the state of health and the access to healthcare, regardless of the definition of migrant used. The verification of these discrepancies between countries is supported by the indicators set by the Migrant Integration Policy Index (MIPEX). The MIPEX classifies countries, from 0 to 100, according to the government's policies that promote the integration of migrants in different institutional domains, which includes healthcare.[3]

Taking into account these indicators, which reflect intra-country and inter-country disparities, and based on the European context of Healthcare and Migration, this study addresses the following questions: First, is there any evidence of an inequality between migrants and natives either in the state of health or in the access to healthcare?[4] Secondly, what are the reasons that explain these potential disparities? Third, do government's policies, which promote the integration of migrants, have an impact on the satisfaction of healthcare needs among migrants? And, lastly, what is the role of the healthcare systems' characteristics in this same issue?

This research project is structured into six sections. Section 2 explores the literature used as support. The dataset and the procedure to generate the variables, supported by some descriptive statistics, are detailed in Section 3. Section 4 explains the empirical methodology and the econometric approach, whereas Section 5 presents some of its most relevant results. The last section is reserved for some conclusion and reflections.

[3] Regarding this latter issue, the criteria used in the classification of the countries are based on four dimensions: entitlements, access policies, responsive services and mechanism for changes. The description of these dimensions can be found in Appendix, Table A.1.

[4] Henceforward, as much of the literature suggests, the inequality in the access to healthcare between migrants and natives is here understood as horizontal equity, i.e., equal treatment for people in equal conditions (Barros, 2016)

2 - Literature Review

Migrants tend to experience more health problems than local populations and this gap in the health status can be partly explained by the adaptation to a new cultural, social and legal environment that migrants have to do. According to Bhugra and Becker (2005), the complex migration process and the lack of social support negatively influence the mental health of migrants in the United Kingdom. In addition to mental health, Mladovsky (2009) stated other risk factors that according to the literature tend to affect relatively more the migrant population[5]. Those factors include habits like alcohol, smoking, and illegal drugs, STD's like HIV, and poor nutrition, while regarding chronic diseases, migrants are in a relatively more favorable position. Following the evidence of this latter particular case, it is important to highlight that, on the other hand, much has been written about the opposite perspective of the health status gap between migrants and natives, which is theoretically and partly explained by the healthy migrant effect.

Based on empirical observations in some developed host countries, namely the United States and Canada, the healthy migrant effect is a mortality advantage of first-generation migrants, contrasting to comparable natives, at the moment they arrive in the receiving country. Some researchers try to give some plausible explanations for the evidence of this effect. Constant (2017) defends that "immigrants are not a random sample of their home country", and this statement is addressed by Domnich et al. (2012) through the "health selection hypothesis". According to the latter, immigrants and their compatriots, who do not migrate, tend to exhibit some differences, such as that immigrants may be more educated or be better prepared to face risky circumstances.

[5] In a group of 15 countries (Belgium, Denmark, England, Estonia, Finland, France, Germany, Ireland, Italy, Lithuania, Netherlands, Poland, Spain, Sweden, Turkey), Mladovsky (2009) selected England, Italy, the Netherlands and Sweden for the comparative analysis between migrants and natives. Until 2009, these countries were the only four that had established national policies with the objective of improving migrant health.

Moreover, the issue of migrants' selection can also be analyzed from other two perspectives. First, despite some countries screen migrants to obtain information and, then, to forward them to the healthcare system, this method can also be used by some governments to block entry, which means that only the healthiest migrants stay in the host country. Secondly, the "salmon bias" hypothesis also contributes to the low degree of randomness in the migrants' sample, since it suggests that many less healthy elderly Hispanics return from the United States of America to their place of origin (Abraído-Lanza et al., 2009).[6]

Furthermore, these hypotheses, which partly result in an artificially low mortality rate among migrants, also try to explain the paradox inherent to the healthy migrant effect, since migrants exhibit simultaneously better health and a lower socioeconomic situation. However, the lower socioeconomic status and a combination of lifestyle and environmental changes lead to the deterioration of migrants' health, which consequently converges to the health status of natives. (Fennelly, 2007) (Domnich et al., 2012) (Constant, 2017)

Regarding the access to healthcare, the conclusions given by the literature concerning the direction of the inequality between migrants and natives do not diverge in the same way as those drawn from the comparative health status analysis, previously presented.

According to the Expert Panel on Effective Ways of Investing in Health (EXPH) in 2017, "a useful starting point" to deal with the complexity associated with the healthcare topic "is to define the need to healthcare", which lacks a universal definition (Folland et al., 2007). Acheson (1978) presents, amongst others, the Matthew (1971)'s approach, which proposes that need only exists when it can be met with "some medical intervention that has positive utility and that actually alters the prognosis of the disease in some favorable way at reasonable cost." This

[6] According to Abraído-Lanza et al. (2009), *salmon bias hypothesis*, which reflects "the desire to die in one's birthplace", proposes that "Latinos return to their country of birth after temporary employment, retirement, or becoming seriously ill."

definition leads to a central assertion: an individual must exhibit a not-good state of health that is possible to match to some medical treatment, which should alleviate, at least, their condition.

However, sometimes the need for healthcare exists but it is not met with medical treatment, and this mismatch can be originated by either supply or demand factors (Jacobs et al., 2012).[7] Although the literature provides an extensive contribution to measuring access to healthcare, this research project emphasizes on unmet needs for healthcare to evaluate its accessibility. As Guidi et al. (2016) point out, it allows us to take advantage from the availability of this indicator in the cross-sectional survey EU-SILC.[8] Our concern is with the unmet needs of the migrant population.

3 - Data and descriptive statistics

The core database used is the European Union Statistics on Income and Living Conditions (EU-SILC), whose observations are for the annual period between 2004 and 2012 and 31 European countries (the 27 EU Member-States,[9] Croatia, Iceland, Norway and Switzerland).[10] Not all countries have available data for the time range of 2004-2012.[11] The variables that will be used in the empirical analysis were obtained directly and indirectly through the questionnaires collected at a household level (H) and personal level (P), which were respectively answered by the head of the household and by all current household members aged 16 and over. Furthermore, there were collected and obtained macroeconomic variables, whose sources will be mentioned.

7 Based on (Ensor and Cooper 2004) and (Peters et al. 2008), Jacob et al. (2011) exhibit some barriers to accessing healthcare services, specifying if they are influenced by supply or demand factors. Supply-side determinants include, amongst others, costs and prices of services, and waiting lists, while demand-side factors involve indirect costs to the household (e.g., transport cost) and lack of information on healthcare services.
8 European Statistics on Income and Living Conditions
9 In the years of 2004-2012, Croatia (HR) was not an EU Member-State.
10 Countries outside the EU belong to the Schengen Area.
11 The 31 countries are not all available for the period 2004-2012. Croatia (HR) is only available from 2011. Data for Malta (MT) and Switzerland (CH) are only accessible from 2008, while Bulgaria (BG) and Romania (RO) are only available from the year of accession to the European Union (2007). Cyprus (CY), Czech Republic (CZ), Germany (DE), Hungary (HU), Lithuania (LT), Latvia (LV), the Netherlands (NL), Poland (PL), Slovenia (SI), Slovakia (SK) and the United Kingdom (UK) do not have data for 2004.

We shall, now, proceed to the description of the (i) migrant status variable, (ii) health status and healthcare access variables, (iii) socio-demographic factors and (iv) macroeconomic variables.

(i) Migrant Status

In this study, the concept of the migrant is formulated based on to the relationship between the country of residence and the country of birth. [12] [13] The EU-SILC's variable *PB210 – Country of birth* can assume three broad string values: *LOC* if the country of birth and the country of residence are the same; *EU* if the country of birth is another European Union country; *OTH* for the remaining cases. Thus, according to the EU-SILC, a respondent is considered as a migrant if s/he answered *EU* or *OTH*.

Furthermore, migrants can be particularly sub-classified according to two categories. Regarding the *generation level* category, individuals can be first-generation or second-generation migrants. On the other hand, if we take into account the *place of origin* category, there can be considered migrants from a European Union country and migrants from a third country to the European Union.

Within the *generation level* category, individuals, who were born in a country other than where they reside, are considered first-generation migrants. Furthermore, individuals that were born in the country of residence could be either natives or second-generation migrants, since in this latter case only the parents of the respondent were born in another country. In order to define a second-generation migrant, it would be necessary to have access to the country of birth of the respondent's father and that of the respondent's mother. Regarding the EU-SILC variables PT060 – *Country of birth of the father* and PT090 – *Country of birth of the mother*, there are

12 The country of residence is here understood as the country where the survey was conducted. The code for this EU-SILC variable is PB020.

13 This general concept of migrant was not formulated according to citizenship. Thus, this concept includes individuals that acquired the citizenship of the country of residence in the meantime.

only observations for part of the year of 2011. Given this data restriction, the *generation level* category will not be considered in the present research project.

The access to healthcare issue is especially addressed in the European context, since citizens of the European Union have the right to healthcare transnationally, within the EU. On the other hand, whoever is not an EU citizen, as his/her access to this care is conditioned on the legal situation of each country, which might include the granting of permanent or long-term residence status (Mladovsky, 2009). Consequently, it may also then be interesting to sub-classify migrants according to their place of origin. Thus, migrants are sub-classified within the category *place of origin* as EU Migrant, if born in a European Union country, and as Non-EU Migrant, if born outside of the European Union. Although the generation level is not taken into account, note that the category *place of origin* only contains first-generation migrants.

However, in addition to Mladovsky (2009), Waidmann (2003) also acknowledges the relevance of citizenship, stating that Latinos in the United States of America, who are not citizens, are less likely to use healthcare services. Thus, according to the distribution of migrants per citizenship in the EU-SILC database (Table 1) and since the latter has a potential impact in the access to healthcare, the country of birth is not a sufficient condition to classify migrants.

Table 1 – Distribution of migrants per citizenship status (%)

	Citizenship		
	LOC	**EU**	**OTH**
EU Migrant	37.7	61.8	0.5
Non-EU Migrant	51.3	2.68	46

LOC: Citizen of the country of residence; EU: Citizen of an EU country; OTH: Citizen of a non-EU country.

Approximately half of the migrants (51,3%) who were born outside the European Union have the citizenship of the country of residence, while that percentage for migrants from a European Union country is 37,7%. Because of this high presence of individuals who are citizens of a country other than the country in which they born, the migrant status must be specified, taking into account the citizenship status (citizen/non-citizen).

Table 2 – Distribution of migrants per country,[14] EU-SILC 2004-2012 (%)

	Migrant	EU Migrant	Non-EU Migrant	Sample		Migrant	EU Migrant	Non-EU Migrant	Sample
AT	13.4	5.1	8.3	101,346	**IS**	6.3	3.4	2.8	60,168
BE	13.6	6.6	6.9	100,569	**IT**	5.4	1.6	3.8	397,088
BG	0.6	0.16	0.4	76,243	**LT**	6.6	0.5	6.1	86,517
CH	20.6	12.6	8.0	66,676	**LU**	46.0	37.6	8.3	81,255
CY	13.9	6.0	7.9	71,521	**LV**	15.8	0.0	15.8	88,813
CZ	3.6	2.8	0.8	138,474	**MT**	4.2	0.0	4.2	44,649
DE	9.1	0.0	9.1	196,266	**NL**	5.3	1.6	3.7	149,922
DK	5.3	1.8	3.5	105,178	**NO**	7.5	3.0	4.5	98,138
EE	13.7	0.0	13.7	99,854	**PL**	1.3	0.5	0.8	251,857
ES	6.7	1.6	5.1	263,884	**PT**	4.4	1.2	3.2	101,113
FI	2.8	1.2	1.6	191,294	**RO**	0.09	0.04	0.05	97,794
FR	10.4	3.4	7.1	182,853	**SE**	12.4	4.5	7.9	121,522
HR	11.4	1.1	10.3	27,792	**SK**	1.5	1.3	0.2	107,068
HU	1.5	0.7	0.8	158,283	**UK**	9.8	2.4	7.4	132,147
IE	11.7	8.6	3.1	90,985	**Total**	7.8	2.9	4.9	3,808,843

The percentage of migrants in the total observations is 7.8%, with 4.9% coming from outside the European Union. Regarding the distribution of migrants per country, Luxembourg (LU) population has the highest proportion of migrants (45.97%), whereas Bulgaria (BG) and Romania (RO) exhibit the lowest percentages, both of which less than 1%. If we only considered migrants from a third country to the European Union, the highest percentages belong to Latvia (LV) and Estonia (EE) (15.8% and 13.7% respectively). In addition to these two latter countries, Germany (DE) and Malta (MT) have only migrants from outside the EU. The distribution of migrants is not available for Slovenia (SI) since there is no data of the variable *PB220A – Citizenship* for this country.[15] Thus, from now on, only the remaining 30 countries will be considered in this study.

[14] The list with the *iso alpha 2* country codes can be checked in the Appendix, Table A.2.
[15] After specifying the categorization of migrants according to the citizenship status, we will only consider values for *PB210 – Country of Birth* for which there are no missing values for *PB220A – Citizenship*

Regardless the criterion used, it is not possible to go further in categorizing migrant individuals due to some limitations inherent to the methodology followed by the EU-SILC surveys.[16]

(ii) Health Status and Healthcare Access

In order to analyze the inequalities between migrants and natives in the state of health, the EU-SILC contemplates three variables,[17] at personal level, to assess the health status of each respondent: Self-perceived health, which is based on the individual self-assessment of health, ordered from 1 (*Very Good)* to 5 (*Very Bad)*; Chronic Disease, i.e., if the individual suffers from a chronic illness or condition; and, lastly, Limitation in Activities because of health problems.[18]

As already previously stated, the access to healthcare is measured through the unmet needs for healthcare, which is experienced when "there was at least one occasion (in the previous 12 months) when the person **really needed** examination or treatment but did not receive it" (EU-SILC Description of target variables – 2012 Operation).[19] However, unlike some of the following EU-SILC surveys (e.g. 2016 survey), the unmet need's question in 2012 does not allow us to identify the need to healthcare among the individuals who did not declare an unmet need,[20] i.e., it is possible that some respondents did not experience access barriers because they had no need.[21] Nevertheless, this limitation will be taking into account in the empirical

16 In addition to the obstacle already presented, i.e., there is no information about the specific country of birth of the migrant, Lelkes and Zolyomi (2010) identify, amongst others, some limitations:
- "there is no information on ethnic status of respondents";
- it is not possible to measure how long migrants have been in the country and thus, there is "no proxy for the extent of assimilation or integration";
- "illegal or temporary migrants, in particular, are likely to be underrepresented compared to their actual share within the population".

17 The original three EU-SILC variables are coded as PH010, PH020 and PH030.

18 The descriptive statistics of the health status factors among migrants are available in Appendix, table A.3.

19 Regarding this particular question, there is no difference between questionnaires in the period 2004-2012.

20 "Was there any time during the past 12 months when you really needed to consult a specialist but did not?"

21 In fact, some respondents that evaluate their own health status as *Very Good* or *Good*, and so do not **really** need medical treatment, respond to the Unmet Need's question in the EU-SILC surveys. (Appendix, Table A.4) However, unlike the Unmet Need's question, the self-perceived health's question does not take into account the last 12 months, so a person throughout the year may change their health status' self-assessment.

methodology to assess the inequalities between migrants and natives in the healthcare accessibility. Moreover, the EU-SILC survey also asks for the **main** reason that led to the experience of the unmet need for healthcare.[22] In this closed question, the European questionnaire proposes seven specific reasons and an undefined option.[23] Therefore, the differences between natives and migrants in each specific barrier to healthcare access will also be evaluated. The distribution of the main reasons for unmet need among the total sample, and specifically among migrants, is represented in Appendix, table A.5.

(iii) Socio-demographic factors

The main socio-demographic factors considered are age, represented by five age bands {16-29, 30-44, 45-59, 60-74, 75+}, gender and marital status.[24] Plus, the individual education is reported according to the *International Standard Classification for Education* (ISCED),[25] which is ordered from 1 (*pre-primary education*) to 6 (*1st & 2nd stage of tertiary education*). For the household income level, it was considered the *equivalised household income,* which is divided into quintiles, defined for each country and year.[26] Lastly, poverty risk is also contemplated.[27] An individual is at risk of poverty if the equivalised household income is below the poverty threshold. The poverty threshold is, according to the EU-SILC, 60% of the median of the *equivalised disposable income*.

22 The EU-SILC question is coded as PH060.

23 The EU-SILC's seven specific reasons are: "Could not afford to (too expensive)"; "Waiting List"; "Could not take time because of work, care for children or for others"; "Too far to travel/no means of transportation"; "Fear of doctor/hospitals/examination/ treatment"; "Wanted to wait and see if problem got better on its own"; "Didn't know any good doctor or specialist". The undefined reason is displayed as "Other Reasons".

24 The age of each respondent was obtained through the difference between the year when the survey was conducted (PB010) and the year of birth (PB140). Gender and Marital Status are respectively represented by the EU-SILC variables PB150 and PB190.

25 The education level is based on the highest *International Standard Classification for Education* level attained (EU-SILC variable PE040).

26 The *equivalised household income* (EU-SILC variable HX090), takes into account the *total disposable income* (HY020), the *within household non-response inflation factor* (HY025) and the *equivalised household size* (HX050).

It was applied a purchasing power parity conversion rate, specific for each country and year, on the *equivalised household income* variable. The conversion rates were obtained in the OECD database.

27 EU-SILC's variable HX080.

Besides the main socio-demographic factors,[28] three specific characteristics that influence the state of health of the individuals are also considered: poor housing conditions, non-rich diet and susceptibility to environmental problems.[29]

Table 5- Descriptive statistics of the main socio-demographic factors, EU-SILC 2004-2012 (%)

	Migrant	Total
Age Group		
16-29	16.0	19.3
30-44	31.5	24.1
45-59	26.7	26.8
60-74	18.2	20.3
75+	7.6	9.4
***Male* (=1)**	45.0	47.6
***Married* (=1)**	62.0	56.6
Education Level		
pre-primary education	1.7	1.0
primary education	13.7	13.3
lower secondary education	18.0	20.6
(upper) secondary education	35.1	40.6
post-secondary non-tertiary education	4.1	3.7
1st & 2nd stage of tertiary education	27.4	20.8

	Migrant	Total
Disposable Income		
First Quintile	28.9	20.0
Second Quintile	22.1	20.0
Third Quintile	18.0	20.0
Fourth Quintile	15.5	20.0
Fifth Quintile	15.5	20.0
***PovertyRisk* (=1)**	22.1	14.7

Regarding the age distribution (Table 5), the total sample is concentrated almost equally in the 30-44 and 45-60 age groups (24.1% and 26.8% respectively), while migrants are slightly more concentrated in the former than in the latter age group (31.5% and 26.7% respectively). The extreme age group 75+ is the least represented, considering either the total observations or only migrants (9.4% and 7.6% respectively). The gender distribution among migrants is nearly

[28] Although the relevance of labor information on the current activity status and on the current job, which EU-SILC provides through variable PL030, it is not included in the main socio-demographic factors because it is only available for the period 2004-2010.

[29] Poor housing conditions is represented by the EU-SILC variable HH040 "Leaking roof, damp walls/floors/foundation, or rot in window frames or floor"; Non-rich diet is related to the "capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day" (HS050); Susceptibility to environmental problems is assessed if the place where the household lives is affected by "Pollution, grime or other environmental problems" (HS180)

balanced, with the percentage of men being 45%. In respect of the marital status, the proportion of married individuals in the migrant sample is 62%, which, unlike gender, is slightly different from the percentage for the total sample (56.6%).

Table 5 also shows that, considering the total sample, the percentage of the individuals with a tertiary education is 20% approximately, which is lower than that among migrants – 27.4%. Regarding disposable income, the share of migrants tends to decline as we move from the lowest (28.9%) to the highest quintile (15.5%). The risk of poverty is higher among migrants (22.1%) when compared to the total observations of the sample (14.7%).

(iv) Macroeconomic variables

In order to analyze the impact of government's policies that promote the integration of migrants, a variable that reflects the Migrant Integration Policy Index (MIPEX) score for Health, which is ranged from 0 to 100, is required. The original MIPEX score was normalized to a 0-10 range.[30] Table A.6., in Appendix, presents the normalized MIPEX scores of each country.

Regarding the role of the healthcare systems' characteristics in policy decision-making, it was considered Joumard et al. (2010), which identified six groups of countries, within the OECD, that share similar healthcare systems.[31] According to the descriptions of the different groups of countries, there is an evidence of a gradual increase of the role of the public sector in health care systems, from Group 1 to Group 6.

Lastly, there were also considered the macroeconomic levels of education and income.[32]

[30] The normalization process implies the reduction of the score's range to 10, i.e., if the original country's MIPEX score is equal to 64, 65 or 70, it starts to assume the values 6, 7 or 7 respectively.

[31] In the Appendix, table A.7 describes these six different groups and the constituent countries of each group. OECD countries that do not belong to the sample of this study are not considered.

[32] The information about the macroeconomic education and income levels was obtained in the Human Development Reports of the UN. Thus, for the period 2004-2012, geometric means were applied to the indexes of education and income, for each one of the thirty countries that are the object of study in this research. Then the geometric means were transformed on a scale of 0-10, as was done for the MIPEX scores. The macroeconomic education and income scores of each country can be found in Appendix, Tables A.8 and A.9.

4 - Empirical strategy and the Econometric methodology

Although the data is available for different years and different countries, it is not possible to classify the data as panel data since it is not necessarily the same individuals or households that respond to the EU-SILC surveys across the years. Thus, as Cameron and Triverdi (2005) suggest, data with this characteristics must be classified as a repeated cross-section.

The analysis of the inequalities between migrants and natives in the state of health would be based on the following three variables provided by the EU-SILC surveys:[33] self-perceived health, report of a chronic disease and limitation in activities because of health problems. However, in order to carry out a more complete and thorough analysis, and to respond to the issues that have been identified by the literature, it would be necessary to have more information about the migrant population, namely the specific country of birth, the ethnic status and how long migrants have been in the host country. Given this data restriction and in the impossibility to draw the desired evidence, an econometric analysis was not performed on this issue.

On the other hand, this information restriction is not significant enough to prevent an analysis of the access to healthcare. The econometric approach is based on non-linear models since the dependent variables are discrete and binary.[34] Giving preference to the assumption that the error terms, apart from being independent, are normally distributed, the chosen non-linear model to perform the empirical analysis is the probit model, given by:

$$p(y_i = 1|x_i) = F(x_i'\beta) = \Phi(x_i'\beta),$$

where $\Phi(.)$ is the standard normal cumulative distribution function.

[33] Henceforward, natives represent the individuals that were born in the country of residency.

[34] Despite the existence of the possibility of performing a linear probability model, the technical reasons pointed out by econometricians lead to the conclusion that "the linear probability model is inadequate for binary data", since it does not reflect some specific characteristics of probabilities such as being always between 0 and 1. (Cameron and Triverdi, 2005)

The empirical strategy to analyze the inequalities between migrants and natives in the access to healthcare starts with a generic regression:

$$p(UN_i = 1|x_i) = \Phi(\beta_1 Migrant_i + \beta_2 SelfPerceivedHealth_i + \beta_3 X_i)$$

The dependent dummy variable UN_i represents the unmet needs of individual i and evaluates, in this study, the healthcare accessibility. This model regresses UN_i on the migrant status dummy variable ($Migrant_i$), $SelfPerceivedHealth_i$ and on other control variables (X_i), which includes the binary variables for the main socio-demographic factors and the macroeconomic levels of education and income, and dummies for years and countries. The rationale for including the variable $SelfPerceivedHealth_i$, in order to control for the individual health status, is related to the issue that was addressed in the previous section, i.e., the EU-SILC surveys for the period 2004-2012 do not allow us to identify the need for healthcare among the respondents that did not experience access barriers. However, this variable in this model is potentially endogenous, whose source is simultaneity.[35] The proposed solution to this problem follows the conditional mixed-process (CMP) framework implemented by Roodman (2011), which proposes a joint estimation of two equations "with linkages among their error processes". Thus, the generic regression must then be represented by: [36]

$$\begin{cases} p(UN_i = 1|x_i) = \Phi(\beta_1 Migrant_i + \beta_2 SelfPerceivedHealth_i + \beta_3 X_i) \\ p(SelfPerceivedHealth_i = j-1) = \Phi(\alpha_j - \delta_1 UN_i - \delta_2 H_i - \delta_3 Z_i) - \Phi(\alpha_{j-1} - \delta_1 UN_i - \delta_2 H_i - \delta_2 Z_i) \end{cases} \quad (1)$$

Regarding the second equation, UN_i is the dummy variable for Unmet needs, H_i represents the three specific socio-demographic characteristics that theoretically influence the state of health and not the unmet needs. Z_i includes the main socio-demographic factors, and dummies for years and countries.

[35] Simultaneity occurs when an independent variable *x* explains and is explained by a dependent variable *y* simultaneously. If this problem is not taken into account, the model's estimates are biased.
[36] Since *SelfPerceivedHealth* is a multinomial variable, ordered from 1 (*very good*) to 5 (*very bad*), the appropriate model is the ordered probit. α represents the threshold parameters.

After analyzing the unmet needs in general, it is important to focus on each specific reason that led to the unmet needs.[37] The responses are mutually exclusive, i.e., only one reason can be chosen per respondent. Thus, an unordered multinomial logit model is appropriate, which is given by:

$$p\left(UN_{Reason_i} = j\right) = \frac{\exp(\beta_{1j} Migrant_i + \beta_{2j} X_i)}{\sum_{j=1}^{J} \exp(\beta_{1j} Migrant_i + \beta_{2j} X_i)}, \qquad j = 1, \dots, 7^{38} \qquad (\mathbf{1.1})$$

Model (1.1) does not require a CMP framework since it is not necessary to include $SelfPerceivedHealth_i$ as a control variable: only the individuals who have experienced an unmet need can identify the main reason that led to this experience.

Considering the specific European Union's context regarding access to healthcare, the inequalities between migrants and natives will be analyzed only for the EU countries, in order to investigate what happens when the *degree of migration* increases.[38] The econometric methodologies implemented in (1) and (1.1) are and respectively replicated for the variable UN_i [(2.1); (2.2); (2.3)],[39] as well as for UN_{Reason_i} [(2.1.1); (2.2.1); (2.3.1)].[40]

The empirical strategy ends with the analysis of the impact of government's policies, which aim the integration of migrants, and the role of the healthcare systems' characteristics on the healthcare access among migrants, regardless of the reason. Two separate regressions will have to be performed since each one of them implies specific data constraints. The impact of these specific national state policies will be evaluated through the MIPEX. However, the MIPEX score for Health, in particular, is only available for 2014, and the defined time range of the EU-SILC database is 2004-2012. Because of this no time coincidence, the impact of the MIPEX

37 The seven reasons are specified in footnote 23.

38 In the specific European Union context, it is considered, in this study, that the *degree of migration* increases when we restrict the migrant group as follows: (*Migrant – Migrant from outside the EU - Migrant from outside the EU and without EU citizenship*). For instance, in France, a Brazilian-born citizen is considered *more migrant* than a Brazilian-born German citizen, and the latter is *more migrant* than a German-born citizen.

[39] The migrant status explanatory variable in the regressions (2.1), (2.2) and (2.3) are respectively *Migrant*, *Migrant from (born) outside the EU* and *Migrant from (born) outside the EU and without EU citizenship*.

[40] Furthermore, these regressions use exactly the same control variables as (1) and (1.1).

score for Health on the access to healthcare will be assessed only for the year of 2012.[41] On the other hand, the analysis of the role of the healthcare systems' characteristics is restricted spatially, i.e., it is only available for the OECD member countries. Thus, these two models, which use the same control variables as (1), are defined as follows:

$$\begin{cases} p(UN\_2012\_Migrant_i{}^{42} = 1|x_i) = \Phi(\beta_1 MIPEX_i + \beta_2 SelfPerceivedHealth_i + \beta_3 X_i) \\ p(SelfPerceivedHealth_i = j-1) = \Phi(\alpha_j - \delta_1 UN_i - \delta_2 H_i - \delta_3 Z_i) - \Phi(\alpha_{j-1} - \delta_1 UN_i - \delta_2 H_i - \delta_3 Z_i) \end{cases} \quad (3)$$

$$\begin{cases} p(UN\_OECD\_Migrant_i{}^{43} = 1|x_i) = \Phi(\beta_1 OECDgroup_i + \beta_2 SelfPerceivedHealth_i + \beta_3 X_i) \\ p(SelfPerceivedHealth_i = j-1) = \Phi(\alpha_j - \delta_1 UN_i - \delta_2 H_i - \delta_3 Z_i) - \Phi(\alpha_{j-1} - \delta_1 UN_i - \delta_2 H_i - \delta_3 Z_i) \end{cases} \quad (4)$$

$MIPEX_i$ and $OECDgroup_i$ include k-1 dummies for each MIPEX score and for each OECD group identified by Joumard (2011), respectively.

The results in the following section were obtained through the software Stata. In models (1)-(4), the effect of the explanatory variables is measured by marginal effects,[44] since we are dealing with nonlinear models. The marginal effects presented in the next section are Average Marginal Effects (AME).

Results

Regarding the main reasons for unmet need for medical care, the interpretation of the results, which are exhibited in tables 7 and 8.1-8.3, is only focused on the reasons that were significantly more experienced by migrants (Appendix, table A.5).[45] Multinomial models (1.1, 2.1.1, 2.2.1, 2.3.1) do not violate the IIA[46] assumption (Appendix, tables A.10).

In models (1) and (1.1), the AME's for the explanatory variable of interest, *Migrant*, are always

41 This two years gap is negligible since the MIPEX overall score, which is available since 2007, did not change significantly between 2012 and 2014 - the country's average growth rate of MIPEX overall score between 2012 and 2014 was about 0,7%.
42 The dependent variable in model (3) represents the unmet needs among migrants for the year of 2012.
43 The dependent variable in model (4) represents the unmet needs among migrants for the OECD countries.
44 The theoretical method for obtaining marginal effects can be found in Cameron and Triverdi (2005).
45 The main reasons that were significantly experienced by, at least, 10% of the migrants are identified in **bold** in Tables 7 and 8.1-8.3.
46 Independence of Irrelevant Alternatives

statistically significant at a 5% level, except for the reason related to time constraints. Migrants are 0.977 percentage points (p.p.) more likely than natives to experience an unmet need, ceteris paribus.[47] Despite the very low significance of this AME in economic terms, its sign indicates that the inequality between migrants and natives is unfavorable to the former. Table 7 also shows that migrants are 4.87 p.p. more likely to face an unmet need because they could not afford the healthcare service. Regarding the other reasons, which are not as experienced by migrants as the latter, only "Wanted to wait and see if problem got better" has a slightly similar magnitude, but with opposite sign.[48]

The positive sign of the marginal effect for the variable *SelfPerceivedHealth* indicates that individuals who self-evaluate themselves as unhealthy are on average more likely to experience an unmet need than their counterparts. This sign, which is expected, may be explained by the fact that the unmet needs are more likely to be experienced by those who need healthcare most. It will also be interesting to look at the inverse causality, i.e., the fact of having a low health status results from experiencing unmet needs.[49]

Regarding the main socio-demographic factors, the magnitude of the AME's is relatively more significant than that for *Migrant*. Individuals aged 30-44 (*AgeGroup2)* are 5.28 p.p. more likely to report an unmet need than individuals aged 75 or more (*AgeGroup5)*. Concerning the reasons that lead to unmet need, the most relevant role of age is in the reason related to time constraints, which is expected since the majority of the individuals within the labor force or with children to take care of are in the lowest age groups. Individuals with the lowest education level, pre-primary (*EducLv1*), are only 0.651 p.p. more likely to experience an unmet need than individuals with the highest education level (*EducLv6*). However, if we focus on the reason that

[47] Henceforward, every interpretation of the AME's follows the *ceteris paribus* assumption.
[48] Since each respondent can choose only one reason for the unmet needs (mutually exclusive responses), it is expected that the AME's compensate for each other.
[49] The results of conditional mixed process for the second equation of the system of equations **(1)** described in page 16 can be found in Appendix, Table A.11, which only includes the AME's for the dummy variable for Unmet needs (UN_i) and the control variables H_i that theoretically explains the state of health and not the unmet needs.

deals with financial constraints, the magnitude of the difference between the lowest and the highest level of education increases substantially: an individual with the lowest education level is 10.789 p.p. more likely to have an unmet need due to financial reasons than those with the highest level.

Table 7 - Results for Models (1) and (1.1)[50]

	(1) UN_i		**(1.1) Could not afford to**	**(1.1) Waiting list**	(1.1) Too far to travel / no means of transport	**(1.1) Could not take time because of work**	(1.1) Fear of doctor hospital treatment	**(1.1) Wanted to wait and see if problem got better**	(1.1) Did not know any good doctor
	Coefficient	AME	AME						
Migrant	0.0821***	0.00977***	**0.04870** ***	**-0.00430***	-0.00605***	**-0.00104**	-0.00614***	**-0.03567*****	0.00583***
SP_Health	0.327***	0.0389***	-	-	-	-	-	-	-
AgeGroup1	0.222***	0.0265***	**0.01076*****	**-0.07651*****	-0.05294***	**0.2619*****	-0.0164*	**-0.02861*****	-0.00653***
AgeGroup2	0.444***	0.0528***	**0.03336*****	**-0.07753*****	-0.04882***	**0.2809*****	-0.02452***	**-0.05053*****	-0.00784***
AgeGroup3	0.371***	0.0441***	**0.05544*****	**-0.0675*****	-0.03852***	**0.23583*****	-0.01762***	**-0.06381*****	-0.00661***
AgeGroup4	0.156***	0.0186***	**0.03954*****	**-0.02489*****	-0.01867***	**0.1062*****	-0.00527*	**-0.03318****	-0.00228
Male	-0.0107***	-0.00211***	**-0.03611*****	**-0.01586*****	-0.00438***	**0.00736****	0.01329***	**0.03162*****	-0.00055
Married	-0.0754***	-0.00897***	**-0.03737*****	**0.01572*****	-0.00469***	**0.03094*****	0.00132*	**0.01269*****	-0.00143
EducLv1	0.0547***	0.00651***	**0.10789*****	**-0.03206*****	0.03343***	**-0.09875*****	0.02776***	**0.02276****	-0.0061***
EducLv2	-0.00854	-0.00102	**0.09098*****	**-0.02867*****	0.02477***	**-0.0683*****	0.02176***	**0.0027***	-0.00787***
EducLv3	-0.00716	-0.000852	**0.0825*****	**-0.03392*****	0.01705***	**-0.07063*****	0.02185***	**0.00937*****	-0.00949***
EducLv4	-0.0324***	-0.00386***	**0.0462*****	**-0.02024*****	0.00518***	**-0.0331*****	0.0125***	**0.0041*****	-0.00512***
EducLv5	0.0204**	0.00243***	**0.03416*****	**-0.00913***	-0.00232	**-0.01792*****	0.00676***	**0.00069**	-0.00263
q1	0.207***	0.0246***	**0.22337*****	**-0.05692*****	0.01194***	**-0.08305*****	-0.00869**	**-0.04565*****	-0.00557***
q2	0.156***	0.0185***	**0.1817*****	**-0.04688*****	0.01237***	**-0.06799*****	-0.00796***	**-0.02983*****	-0.00577***
q3	0.0947***	0.0113***	**0.13824*****	**-0.03427*****	0.00952***	**-0.04961*****	-0.00841**	**-0.02066*****	-0.00463***
q4	0.0402***	0.00527***	**0.08875*****	**-0.01679*****	0.00416***	**-0.035*****	-0.00517***	**-0.01351****	-0.00226
PovertyRisk	0.0709***	0.00927***	**0.03211*****	**-0.01242*****	0.00679*	**-0.01617*****	-0.00041*	**-0.000071**	-0.00086
Educ_country7	1.339***	0.159***	**0.46029*****	**-0.32196*****	-0.02631***	**0.02921*****	-0.03882***	**0.19078*****	0.008255**
Educ_country8	0.702***	0.0836***	**0.08556*****	**-0.20877*****	-0.02241***	**0.10738*****	-0.01898**	**0.23624*****	0.01185***
Inc_country8	0.351***	0.0418***	**0.15868*****	**0.25226*****	-0.0612***	**0.14059*****	0.07236***	**-0.12851*****	-0.0312***
Inc_country9	0.286***	0.0340***	**-0.40101*****	**0.29839*****	-0.09637**	**0.10676*****	0.02352***	**0.06406*****	-0.01768***
N	3283896		235774	235774	235774	235774	235774	235774	235774

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[50] This table does not exhibit the Average Marginal Effects for the dummies for years and countries.

The differences between the lowest and the highest quintile (*q5)*, regarding the probability of reporting an unmet need, are relatively more significant in economic terms than those between migrants and natives: individuals in the lowest quintile are on average 2.46 p.p. more likely to experience an unmet need than those in the highest quintile. Moreover, when considering the reason that is most influenced by income, the magnitude is considerable higher: individuals within the lowest quintile are 22.3 p.p. more likely to declare an unmet need due to financial reasons than those within the highest. Still regarding this latter reason, the dummy variable that indicates poverty risk does not exhibit a comparable magnitude, when contrasting to the AME's for the lowest quintile. This difference of magnitudes may be due to the definition of *poverty threshold* used by the EU-SILC.[51] Gender and marital status differences do not have a substantial impact on unmet needs. On the other hand, the probability of reporting an unmet need is, on average, higher in countries with lower scores for Education and Income than those with higher scores.

Tables 8.1-8.3[52] exhibit the results for the models that consider only the European Union member-states, in order to assess the *degree of migration* in this specific context. The AME's for the migrant status variables are presented in these three tables. The *degree of migration* does not have a determinant role in the probability of reporting an unmet need in absolute terms, which is not the case in relative terms: while migrants are 0.749 p.p. more likely to experience an unmet need than natives, migrants born outside the EU and without EU citizenship are 1.456 p.p. more likely to report the same problem than natives, migrants born in the EU, and migrants born outside the EU with EU citizenship. Among the reasons for unmet needs, the AME's for the financial reason, which exhibit the highest magnitudes, vary more significantly in absolute terms than those for the remaining reasons, when the degree of migration changes from

[51] See end of page 12.
[52] The results for the remaining variables, except the dummies for years and countries, can be found in Appendix. Table A.12 only exhibits the remaining AME's for the model (2.1) and (2.1.1.).

x_1 to x_3. It is also important to highlight that citizenship contributes undoubtedly more for that significant variation than the country of birth, since the AME for financial reasons decreases from (2.1.1) to (2.2.1) and increases from (2.2.1) to (2.3.1). The latter indicates that migrants born outside the EU and without EU citizenship are around 8 p.p. more likely to report an unmet need due to financial reasons than their counterparts.

Tables 8.1-8.3 - Average Marginal Effects for Models **(2)** (only European Union countries)

	UN_i	**Could not afford to**	**Waiting list**	Too far to travel / no means of transport	**Could not take time because of work, care for children of for others**	Fear of doctor hospital examination treatment	**Wanted to wait and see if problem got better**	Did not know any good doctor
	(2.1)	**(2.1.1)**	**(2.1.1)**	(2.1.1)	**(2.1.1)**	(2.1.1)	**(2.1.1)**	(2.1.1)
x_1	0.00749***	**0.05259*** **	**-0.00392***	-0.00466***	**0.000265**	-0.00691***	**-0.03612*** **	0.0058***
N	3131964	229545	229545	229545	229545	229545	229545	229545
	(2.2)	**(2.2.1)**	**(2.2.1)**	(2.2.1)	**(2.2.1)**	(2.2.1)	**(2.2.1)**	(2.2.1)
x_2	0.00914***	**0.04512*** **	**-0.00219**	-0.00554***	**0.00006**	-0.00787***	**-0.03898*** **	0.00615***
N	3131964	229545	229545	229545	229545	229545	229545	229545
	(2.3)	**(2.3.1)**	**(2.3.1)**	(2.3.1)	**(2.3.1)**	(2.3.1)	**(2.3.1)**	(2.3.1)
x_3	0.01456***	**0.07938*** **	**-0.0091*** **	-0.00679***	**-0.00678*** **	-0.01247***	**-0.04191*** **	0.00652***
N	3131964	229545	229545	229545	229545	229545	229545	229545

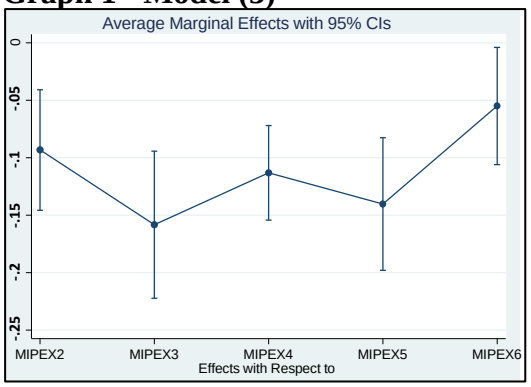
*** p < 0.05, ** p < 0.01, *** p < 0.001**

Explanatory variables - x_1: Migrant; x_2: Migrant born outside the European Union; x_3: Migrant born outside the European Union and without EU citizenship. The counterparts of the dummy variables x_1, x_2 and x_3 are respectively: natives; natives and migrants born in the EU; natives, migrants born in the EU and migrants born outside the EU with EU citizenship

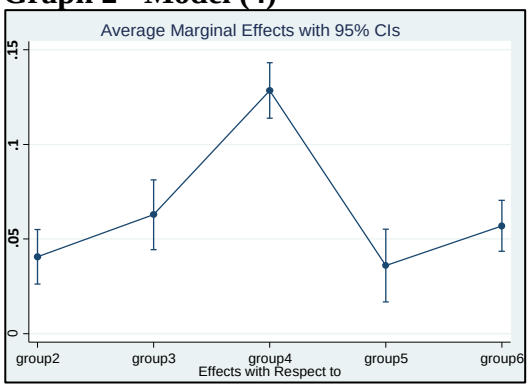
Graph 1 illustrates the AME's for the dummy variables for the MIPEX scores for health. Higher scores of MIPEX indicate that countries, through national policies, integrate migrants better. The positive linear trend, followed by the AME's, demonstrates the opposite, since the probability of a migrant experiencing an unmet need is approximately 15 p.p. lower in a country scored '3' than in a country scored '7'.[53] The AME's for the dummy variables for each group of countries that share similar healthcare system's characteristics are represented in Graph 2. The probability of a migrant reporting an unmet need, for any of the five groups, is higher than that for *group1*, which has the least state intervention in the health sector.[53] Furthermore, it is possible to identify four clusters of AME's among the six groups, being the middle clusters close to each other: *group1*; *group2* and *group5*; *group3* and *group6*; and *group4*.

[53] The reference categories in Graph 1 and Graph 2 are respectively *MIPEX7* and is *group1*.

Graph 1 - Model (3)



Graph 2 - Model (4)



Graph 1 - Impact of MIPEX scores on unmet needs among migrants, in 2012.
Graph 2 - Impact of OECD groups, which share similar healthcare systems characteristics, on unmet needs among migrants.

6 – Discussion and Conclusion

This research analyzes the inequalities in the healthcare accessibility for the group of migrants, considering thirty European countries and the period of 2004-2012.

The EU-SILC is a reference source that collects a large amount of data, which covers several subject areas, such as health and healthcare. The significant advantage of this database is the possibility to perform an analysis on a great scale. However, while presenting this advantage of concentrating data from different countries, it also exhibits some limitations, which were crucial in the course of this study. Moreover, it becomes evident in the beginning, since, in the absence of a universal definition, this study obliges to the formulation of the concept of the *migrant*. In this present research, the migrant is defined according to the country of birth, and given the specific characteristics of the individuals in this sample, it is complemented according to the citizenship. However, there is no access to relevant and specific information about the migrant, which consequently resulted in the non-performance of the analysis of the state of health of the migrants, contrasting with that of the natives. EU-SILC provides information on unmet needs. Given the availability of unmet needs in this database, associated with the contributions of part of the literature, this indicator was chosen as a proxy to measure access to healthcare.

Regarding the most important results in this subject area, we initially observe that there are no substantial differences between migrants and natives in access to healthcare. On the other hand,

the transition from one age group to another affect relatively more unmet needs than the fact of being migrant. Thus, the motives to these differences between age groups, which disadvantage younger individuals, deserve a careful attention from the healthcare systems.

Then, we look at the specific context of the European Union, where EU citizens have the right to healthcare transnationally. When the *degree of migration* increases, i.e., when we gradually restrict the migrant sample to the individuals born outside the EU and without EU citizenship, the inequality, in reporting an unmet need, increases expressively in relative terms. If we look at the more experienced main reason for unmet need by migrants, the financial reason, those same differences in the access to healthcare are amplified. Although we are not dealing with a pronounced inequality in absolute terms, we can extrapolate the marked impact of the *degree of migration*: if particular categories of migrants, which may be underrepresented or not represented at all, were considered and explicitly identified in the EU-SILC database (e.g., illegal and temporary migrants, or refugees), the inequality might be more evident as these categories are expected to be more financially disadvantaged.

The apparent paradox inherent in the results of the model using MIPEX data may be related to a possible mismatch of interpretation of *access to healthcare* between MIPEX and EU-SILC. Another reason may be associated with the data restriction faced in this research, thus suggesting that further investigations should be conducted to study the relationship between MIPEX scores for health and unmet needs, for a longer period. Lastly, it is also possible that the countries in each *MIPEX score* group exhibit other macroeconomic similarities, which might influence the obtained results. This latter reason is also valid for the results of the model that is based on groups that share similar healthcare system's characteristics. Yet, the differences between healthcare systems appear to do not have an impact on unmet needs among migrants, since distant groups, regarding public intervention in the health sector, exhibit similar effects.

In an increasingly globalized world, where health is a clear determining factor in the life of human beings, the inequalities in the access to healthcare services certainly need to be the concern of future investigations. This particular subject must be analyzed for the period 2016 onwards, where the EU-SILC question on unmet needs explicitly distinguishes individuals that need healthcare from those that do not.

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Appendix

Table A.1 – Description of the MIPEX Health Score's dimensions (http://www.mipex.eu/health)

Dimensions	Description
Entitlements	"Although the law may grant migrants certain entitlements to healthcare coverage, administrative procedures (e.g. requirements for documentation or discretionary decisions) often prevent them from exercising these rights. Wide discrepancies exist for legal migrants, despite the EU's declared aim to harmonise their entitlements. CY scores lowest, with an integrated system of health coverage for nationals still under development. ES and PT have cut back some entitlements as part of austerity policies. UK has introduced new restrictions for migrants. Precise entitlements in MT are not legally formalised, while Central European countries with few migrants offer only limited entitlements. By contrast, countries such as BE, FR, NL, SE and CH grant virtually the same entitlements to migrants as for nationals Entitlements for asylum seekers also show wide variations. KR, LV, DE, MT and LT offer only limited rights or impose administrative barriers, while CA has abolished entitlements for certain categories of asylum seekers. In many countries, entitlements require that asylum-seekers remain inside reception centres or designated areas. On the other hand, TU and FR offer virtually the same entitlements as for nationals, while GR, RO, AT and CZ are not far behind Coverage for undocumented migrants remains a controversial issue in most countries. BG, NO, NZ, KR, LV, AU, BH, PL, CZ and TU do not even cover emergency care, although some treatments may be provided on public health grounds. By contrast, CH, SE, IT, NL, LU, CY and FR provide partial or complete healthcare coverage under certain conditions. In many countries, administrative barriers prevent undocumented migrants from exercising their legal entitlements."
Access policies	"Multiple methods and languages are used to inform all categories of migrants about entitlements and the use of health services in FR, IS, IE, JP, PT, ES, CH, BE, NZ and SI; in contrast, HU and BG do little or nothing. There is strong support for health education and promotion in IS, IE, JP, PT, CH, NZ, AT, SE, FI and US, but these activities seem to be ignored in CZ, LV, GR, HR and HU. Cultural mediators or trained patient navigators are provided to a certain degree in 18 countries. Healthcare providers are required to report undocumented migrants in SE, BH, SI, UK, HR and DE, whereas this is forbidden in CZ, DK, FR, IS, IT, NO, PT, ES, CH, NL and US (either by law or by professional codes of conduct). In HR, DE, GR and TU, legal sanctions are possible against providing care to them, and organisations may discourage staff from doing so in AU, BE, CA, LT, LU, NL, NZ, SI, UK, US."

Responsive services	"Most effort made to adapt services to the needs of migrants in UK, NZ, US, AU, AT, while in LT, TU, SI, SK, PL, EE, BG, LV, GR, HR do little or nothing in this direction. Language support is provided where necessary in 14 countries (UK, NZ, US, AU, AT, CH, DE, SE, IE, NO, IT, FI, BE, LU), but hardly at all in most Central and Southeast European countries (RO, BH, CY, LT, SK, PL, EE, BG, LV, GR, HR). In 21 countries, migrants are involved to some extent in information provision, service design and delivery – most actively in AT, 14 MIPEX2015 HEALTH AU, IE, NZ, UK Staff are only prepared for migrants' specific needs at national level in UK, NZ, CH, NO. In 17 countries no training modules are regular available."
Mechanisms for change	"Active measures promoting change in AU, NZ, NO, UK, US, and promising efforts in IE, with little policy support to achieve change in HR, FR, LV, LU, SI, IS, PL. Most countries have the research and data they need to address migrants' specific health needs. Action plans on migrant health have been developed in 22 countries though rarely involving measures to implement them (AU, NO, IE, KR) or migrant health stakeholders."

Table A.2. – *iso alpha 2* country codes, organized alphabetically and by EU membership, 2012

Code	Country
AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HU	Hungary
IE	Ireland
IT	Italy

Code	Country
LT	Lithuania
LV	Latvia
MT	Malta
NL	The Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	The United Kingdom
CH	Switzerland
HR	Croatia
IS	Iceland
NO	Norway

Table A.3 - State of health of migrants and total sample, EU-SILC 2004-2012 (%)

	Self-perceived Health						
	very good	good	fair	bad	very bad	***ChronicDisease* (yes)**	***Limitation in Activities* (yes)**
Migrant	24.6	41.3	22.5	9.2	2.3	30.4	25.1
Total	21.9	42.3	24.3	9.2	2.4	31.3	25.5

Table A.4 -Unmet needs for each level of self-perceived health, EU-SILC 2004-2012 (%)

Self-Perceived Health	**Unmet Need**	
	No	Yes
Very Good	97.55	2.45
Good	95.17	4.83
Fair	89.48	10.52
Bad	84.32	15.68
Very Bad	81.01	18.99

Table A.5 - Distribution of migrants and total sample per reason for unmet need, EU-SILC 2004-2012 (%)

	Main reason for unmet need for medical examination or treatment								Sample size
	Could not afford to (too expensive)	Waiting list	Could not take time because of work, (…)	Too far to travel no means of transportation	Fear of doctor hospital examination treatment	Wanted to wait and see if problem got better on its own	Did not know any good doctor or specialist	Other reasons	
Migrant	37.8	13.8	11.2	3.4	3.8	16.6	3.0	10.4	19,788
Total	34.9	14.7	12.6	3.7	4.8	18.4	1.7	9.3	241,982

Table A.6. – *Transformed* MIPEX score per country

AT	**BE**	**BG**	**CH**	**CY**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**GR**	**HR**	**HU**
6	5	3	7	3	4	4	5	3	5	5	5	3	2	4

IE	**IS**	**IT**	**LT**	**LU**	**LV**	**MT**	**NL**	**NO**	**PL**	**PT**	**RO**	**SE**	**SK**	**UK**
6	4	6	3	4	2	5	6	7	3	4	5	6	3	6

Table A.7. – OECD groups that share similar healthcare system's characteristics (Joumard (2011)

Group	Description	Countries
1	"Extensive reliance on market mechanisms in regulating both basic and 'over the basic' insurance coverage and abundant private provision of health care."	Germany Netherlands Slovak Republic Switzerland
2	"Public basic insurance overage combined with private insurance beyond the basic coverage. Heavy reliance on market mechanisms at the provider level, with wide patient choice among providers and fairly large incentives to produce high volumes of services contained by gate-keeping arrangements."	Belgium France
3	"Public basic insurance coverage combined with little private insurance beyond the basic coverage. Extensive private provision of care, with wide patient choice among providers and fairly large incentives to produce high volumes of services. No gate-keeping and soft budget constraint. Limited information on quality and prices to stimulate competition."	Austria Czech Republic Greece Luxembourg
4	"Mostly public insurance. Users are given ample choice of providers but supply is limited and prices tightly regulated. Gate-keeping is virtually inexistent."	Iceland Sweden
5	"Mostly public insurance. Health care is provided by a heavily regulated public system and the role of gate-keeping is important. Patient choice among providers is limited and the budget constraint imposed via the budget process is rather soft."	Denmark Finland Portugal Spain
6	"Mostly public insurance. Health care is mainly provided by a heavily regulated public system, with strict gate-keeping, little decentralization and a tight spending limit imposed via the budget process."	Hungary Ireland Italy Norway

Table A.8. – Macroeconomic Education level per country

AT	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU
8	8	7	8	8	9	9	9	9	8	8	8	8	7	8

IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SK	UK
9	8	8	9	8	8	7	9	9	8	7	7	8	8	9

Table A.9. – Macroeconomic Income level per country

AT	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU
9	9	8	10	9	8	9	9	8	9	9	9	9	8	8

IE	IS	IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SK	UK
9	9	9	8	10	8	8	9	10	8	8	8	9	8	9

Table A.10. - Hausman tests of IIA assumption

Ho: Odds(Outcome-J vs Outcome-K) are independent of other alternatives

Note: A significant test is evidence against Ho.

Note: If chi2<0, the estimated model does not meet asymptotic assumptions

MODEL 1.1	chi2	df	P>chi2
Could not afford it	-604.970	250	.
Waiting list	-163.464	250	.
Too far to travel	-261.871	251	.
Could not take time	-45.932	251	.
Fear of doctor	-204.381	251	.
Wanted to wait	-150.598	251	.
Did know any good doctor	-36.462	251	.

MODEL 2.1.1	chi2	df	P>chi2
Could not afford it	-407.682	185	.
Waiting list	-90.695	183	.
Too far to travel	-50.123	184	.
Could not take time	-83.804	185	.
Fear of doctor	-43.087	185	.
Wanted to wait	-95.559	185	.
Did know any good doctor	-23.514	185	.

MODEL 2.2.1	chi2	df	P>chi2
Could not afford it	-186.819	185	.
Waiting list	-459.699	184	.
Too far to travel	-499.029	185	.
Could not take time	-69.082	185	.
Fear of doctor	-85.824	185	.
Wanted to wait	-352.162	185	.
Did know any good doctor	-15.880	185	.

MODEL 2.3.1	chi2	df	P>chi2
Could not afford it	-377.838	185	.
Waiting list	- 809.309	185	.
Too far to travel	-523.566	184	.
Could not take time	-82.652	184	.
Fear of doctor	-3.248	185	.
Wanted to wait	-929.681	185	.
Did know any good doctor	-0.970	185	.

Table A.11. - Average Marginal Effects, dependent variable: Self-Perceived Health

	VERY GOOD	GOOD	FAIR	BAD	VERY BAD
UN_i	-0.123***	-0.0280***	0.0750***	0.0533***	0.0229***
$HousingDeprivation_i$	-0.0446***	-0.0101***	0.0271***	0.0193***	0.00830***
$AffordMeal_i$	-0.0528***	-0.0120***	0.0321***	0.0228***	0.00982***
$Pollution_i$	0.0303***	0.00688***	-0.0184***	-0.0131***	-0.00563***
N	3359630	3359630	3359630	3359630	3359630

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

UN_i equals 1 if an individual experienced an unmet need, and 0 otherwise;
$HousingDeprivation_i$ equals 1 if the household's dwelling exhibits one of the housing problems suggested by EU-SILC ("Leaking roof, damp walls/floors/foundation, or rot in window frames or floor"), and 0 otherwise;
$AffordMeal_i$ equals 1 if the household can afford a meal with meat, chicken, fish, (or vegetarian equivalent), and 0 otherwise;
$Pollution_i$ equals 1 if the household suffers from pollution, grime or other environmental problems, and 0 otherwise;

Tables A.12 – Average Marginal Effects for Models **(2.1)** and **(2.1.1)**
(only for European Union countries)

	(2.1) UN_i	**(2.1.1) Could not afford to**	**(2.1.1) Waiting list**	(2.1.1) Too far to travel / no means of transport	**(2.1.1) Could not take time because of work**	(2.1.1) Fear of doctor hospital treatment	**(2.1.1) Wanted to wait and see if problem got better**	(21.1) Did not know any good doctor
Migrant	0.00749***	**0.05259*** **	**-0.00392*** *	-0.00466***	**0.000265**	-0.00691***	**-0.04123*** **	0.0058***
SP_Health	0.0345***		-	-	-	-	-	-
AgeGroup1	0.0214***	0.0265***	**-0.11719*** **	-0.0522***	**0.2857*** **	-0.0266* *	**-0.06461*** **	-0.01204***
AgeGroup2	0.0511***	0.0528***	**-0.12058*** **	-0.05064***	**0.3069*** **	-0.03757***	**-0.09416*** **	-0.01309***
AgeGroup3	0.0396***	0.0441***	**-0.10635*** **	-03978***	**0.25713*** **	-028022***	**-0.10529*** **	-0.01136***
AgeGroup4	0.0192***	0.0186***	**-04554*** **	-0.0199***	**0.11217*** **	-0.01053*	**-0.05659** **	-0.00483
Male	-0.0043***	-0.00211***	**-0.03416*** **	-0.00943***	**0.00917** **	0.01726***	**0.03825*** **	-0.00087
Married	-0.0094***	-0.00897***	**0.01322*** **	-0.00566***	**0.03154*** **	-0.00062	**0.00897*** **	-0.00271*
EducLv1	0.00534***	0.00651***	**-0.03653*** **	0.03986***	**-0.1135*** **	0.03466***	**0.01249** **	-0.0079***
EducLv2	-0.00263**	-0.00102	**-0.0311*** **	0.02736***	**-0.0891*** **	0.02197***	**0.00312* **	-0.00826***
EducLv3	-0.000852	-0.000852	**-0.02881*** **	0.02413***	**-0.07812*** **	0.02033***	**0.00301*** **	-0.00749***
EducLv4	-0.00318***	-0.00386***	**-0.02313*** **	0.00518***	**-0.0331*** **	0.0125***	**0.0041*** **	-0.00512***
EducLv5	0.0021***	0.00243***	**-0.00913* **	-0.00232	**-0.01792*** **	0.00676***	**0.00069**	-0.00263
q1	0.0262***	0.2461***	**-0.06094*** **	0.012***	**-0.0832*** **	-0.0091**	**-0.04605*** **	-0.0057***
q2	0.0189***	0.1912***	**-0.05135*** **	0.01819***	**-0.0701*** **	-0.00802***	**-0.02953*** **	-0.00604***
q3	0.0162***	0.123***	**-0.02727*** **	0.00885***	**-0.0466*** **	-0.00812**	**-0.01994*** **	-0.00502***
q4	0.00611***	0.0916***	**-0.01933*** **	0.00435**	**-0.0372*** **	-0.00507***	**-0.01346** **	-0.00239*
PovertyThr	0.00805***	0.0327***	**-0.01565*** **	0.00866***	**-0.01701*** **	-0.0008*	**-0.000019**	-0.00032
Educ_country7	0.141***	0.409***	**-0.29543*** **	-0.02876***	**0.02456*** **	-0.04432***	**0.19765*** **	0.0082**
Educ_country8	0.0813***	0.0867***	**-0.21213*** **	-0.02718***	**0.1143*** **	-0.0155**	**0.2297*** **	0.00937***
Inc_country8	0.0376***	-0.1379***	**0.2399*** **	-0.0588***	**0.15943*** **	0.07753***	**-0.12851*** **	-0.03222***
Inc_country9	0.0301***	-0.362***	**0.30102*** **	-0.1012**	**0.11271*** **	0.02712***	**0.06016*** **	-0.0184***
N	3131964	229545	229545	229545	229545	229545	229545	229545

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$